

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
14 April 2005 (14.04.2005)

PCT

(10) International Publication Number
WO 2005/033465 A2

(51) International Patent Classification⁷:

E21B

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:

PCT/US2004/032114

(22) International Filing Date:

30 September 2004 (30.09.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/508,383 3 October 2003 (03.10.2003) US

(71) Applicant (for all designated States except US): SABEUS PHOTONICS, INC. [US/US]; 26679 West Agoura Road, Suite 100, Calabasas, California 91302 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GOLDNER, Eric, L. [US/US]; 27521 Cunningham Drive, Valencia, CA 91354 (US).

(74) Agents: FITZGERALD, John, K. et al.; Fulwider Patton Lee & Utecht, LLP, Howard Hughes Center, 6060 Center Drive, Tenth Floor, Los Angeles, CA 90045 (US).

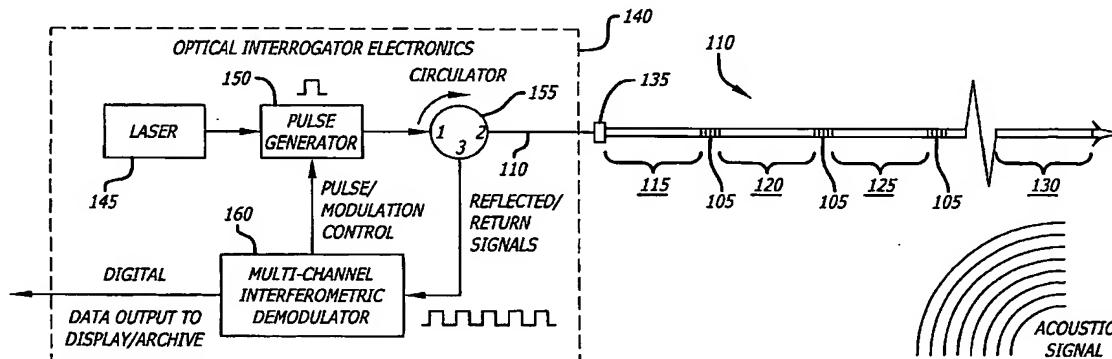
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DOWNHOLE FIBER OPTIC ACOUSTIC SAND DETECTOR



(57) Abstract: An array of fiber optic acoustic sensors is formed within an optical fiber. The array of acoustic sensors may be deployed to a well bore for detecting acoustic signals occurring within the production area of the well bore, such as acoustic signals resulting from sand invading the well bore. A plurality of acoustic sensors may be formed by forming a plurality of periodic refractive index perturbations at selected intervals within the acoustic sensing section of the optical fiber. The optical fiber may be deployed within the well head within a suitable protective arrangement such as deployed through a tube or armor using a suitable material such that the optical fiber is protected, yet retains sensitivity to acoustic signals. The fiber optic acoustic sensor of the present invention may be unobtrusively mounted on the exterior of a well casing such that the sensor is not in the fluid stream.

WO 2005/033465 A2